

Noble metal nanoparticle-based lateral flow devices for colorimetric nanodiagnostics

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Lateral flow devices (LFDs) represent efficient paper-based methods for the evaluation of a variety of target analytes in the context of rapid and portable point-of-care testing technologies.[1] In particular, colorimetric assays allow instrument-free and naked-eye evaluation of the biomarker of interest.[2] Here, we present two noble metal nanoparticle-based strategies to develop LFDs for colorimetric diagnostics. First, a dual-color plasmonic immunosensor for the evaluation of salivary cortisol was developed combining two differently shaped gold nanoparticles (35 nm nanospheres and 60 nm nanostars).[3] Such strategy facilitated an easy and immediate evaluation of cortisol levels, providing a blue-to-pink color change of the detection area. The second assay involved 5 nm platinum nanozymes (PtNPs) for the assessment of total antioxidant capacity in human saliva or in food matrices.[4] The LFD was engineered with a multi-line PtNP-based detection zone, relying on three sequential test lines with increasing amounts of Pt nanocatalysts, able to provide a competitive colorimetric response depending on the antioxidants content of the sample. Notably, both methodologies can be applied as rapid (10 min), non-invasive and accurate monitoring systems, allowing an easy discrimination of various target concentrations.

References

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Figures

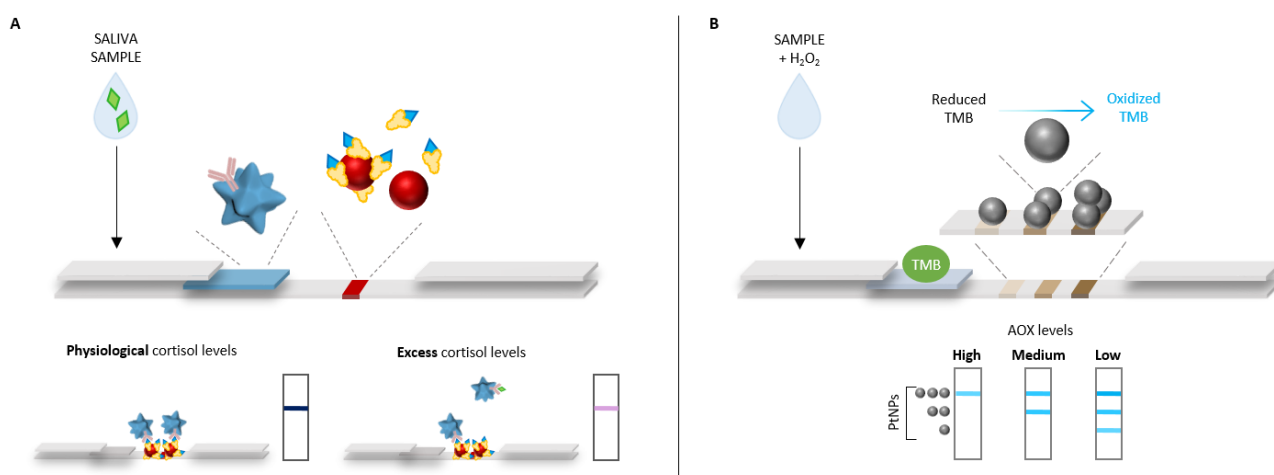


Figure 1: Scheme and working principle of the two colorimetric LFDs. (A) competitive dual-color plasmonic immunosensor for salivary cortisol evaluation, providing a blue-to-pink color change of the test line depending on the hormone's levels. (B) competitive multi-line PtNP-based LFD for antioxidants species assessment, providing a number of blue test lines inversely proportional to the antioxidants content of the sample.